PENNSYLVANIA
TRAIL OF GEOLOGY

HICKORY RUN STATE PARK

BOULDER FIELD

BOULDER FIELD

Hickory Run State Park, located in northern Carbon County on the Pocono Plateau of northeastern Pennsylvania, contains one of the most striking geologic features in the State. The Hickory Run Boulder Field in the northeast corner of the park is a true relic of the past. This boulder field has remained relatively unchanged for more than 20 thousand years.

The boulder field occupies a relatively flat valley near the headwaters of Hickory Run. The valley trends east-west and has low ridges on either side which rise over 200 feet above the surface of the field. Water can sometimes be heard flowing at depth among the boulders.

You will immediately see that the boulder field is quite irregular in outline and surprisingly flat. Measuring approximately 400 feet by 1,800 feet and at least 12 feet deep, this feature is the largest of its kind in the Appalachian Mountains of the eastern United States.

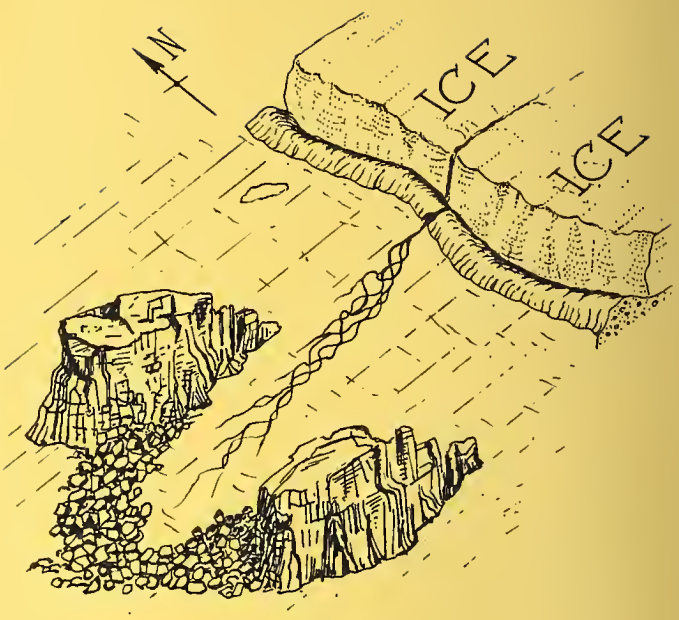
The surface of the boulder field is very uneven and in many places the relief from one boulder to the next is as much as 4 feet. The field is made up of a jumbled assortment of loosely packed boulders generally less than 4 feet in diameter, but sometimes as large as 25 feet in length, and there is no fine material such as sand or clay filling the space between the boulders. The boulders themselves are mainly red sandstones in the northern half of the field; whereas, in the southern half a large number of red conglomerates with white quartz pebbles occur. Walking across the length of the field you will notice a change from rounded boulders near the parking lot to angular boulders near the east end of the field.

The questions that immediately come to mind are: "Where did these boulders come from?" and "How and when did they get here?" Through careful study of this geologic feature, the surrounding area, and similar geologic features throughout the world, geologists have found answers to these questions.


PENNA. TURNPIKE N.E. EXT.
BEAR TRAIL
FOURTH RUN
FOURTH RUN TRAIL
MANOR HOUSE TRAIL
HICKORY RUN
BOULDER FIELD
BOULDER TRAIL
STAGE TRAIL
DEER TR.
SKYLINE TR.
SAND SPRING TR.
PARK OFFICE
Fire Tower
PINE HILL TRAIL
HICKORY RUN
MUD RUN
HAWK FALLS
HAWK RUN
ALBRIGHTSVILLE
PA. ROUTE 115 — 5 miles
903
JIM THORPE 15 miles
WHITE HAVEN 4 miles
Lehigh River
Mmc
Mp
Dcbm
1
2
3

Geologists have found the end moraine of the Wisconsin ice sheet within 1 mile to the north and east of the boulder field. This end moraine is a large pile of unsorted rock and soil fragments built up at the front edge of the glacier and represents the southernmost limit of this ice in northeastern Pennsylvania. From this evidence we know that the area within the park was very close to the glacier and that the climate in the park area at that time was similar to that of Greenland near the Greenland ice cap at the present time. Under these climatic conditions, the ground is permanently frozen and freezing and thawing is severe on the surface during the summer months.

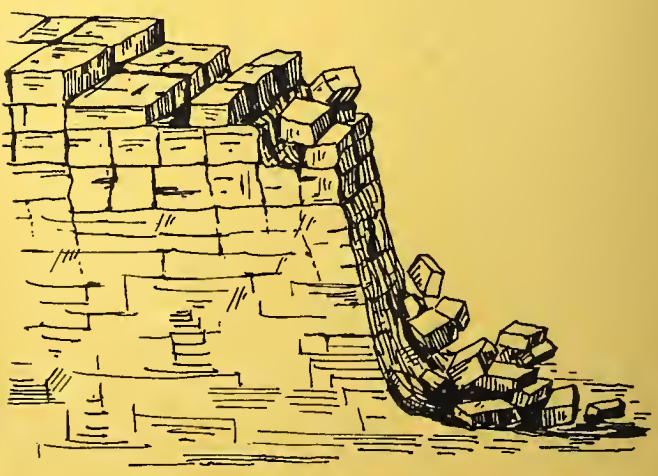
With this climate in mind, let us look next at the topography and rocks in the immediate vicinity of the boulder field. From the Lookout Tower (Sta. 1) you can see two high ridges on the north and south sides of the boulder field. The rocks in these ridges are red conglomerates, sandstones, and siltstones of the upper part of the Catskill Formation and match those found in the boulder field. These ridges therefore represent the probable source for all of the material in the field.



A close examination of the rocks in these ridges also shows them to be fractured in a blocklike manner.

These fractures are natural planes of weakness in the rock and when water seeps into them and freezes, it causes the rock to break away from the outcrop. During glacial times repeated breakup of the rock by freeze and thaw resulted in a pile of angular boulders at the base of these ridges.

Firsthand evidence of these same rocks slowly breaking into blocklike masses may be seen at



Stations 2 and 3. Here you can see the following features:

1. The intersecting joint (fracture) pattern in the sandstone that gives rise to the blocky structure of the rocks.
2. Frost wedging producing mass wasting (breakup) of large and small blocks.
3. The stream following in one of these fracture zones.

Mixed with the accumulated boulders at the base of these ridges was some sand and clay and lots of ice. During each summer thaw the ice in the upper part of this mass melted, and the water-saturated material slid slowly down the slope on the underlying frozen ground. As these boulders moved along, they were constantly grinding against each other, and their angular corners were gradually worn away to produce the rounded boulders seen in the western part of the field. This process of accumulation of boulders and their movement was repeated many times over a period of thousands of years and resulted in the large flat boulder field that we see today.

When the glacier vanished from Pennsylvania and the climate warmed, all movement ceased. For tens of thousands of years this boulder field has remained as stationary as you see it today. During the time that the climate was warming and the ice in the boulder field was melting for the last time, the fine sands and clays between the boulders were washed away leaving the open spaces we see now. At the present time the forest is gradually encroaching onto the field. Leaves, pine needles, and moss are accumulating now between the boulders. This humic debris allows small plants to become established and these in turn are followed by the larger trees.

Alan R. Geyer
Geologist

Visiting Hours

SUMMER SEASON

8:00 A.M. to 9:00 P.M.

OTHER TIMES

8:00 A.M. to sundown

COMMONWEALTH OF PENNSYLVANIA

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